

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SCOTT R. SUMMERFELT, HOWARD R. BERATAN and
BRUCE GNADE

Appeal No. 1998-0765
Application No. 08/451,853

ON BRIEF

Before LALL, DIXON, and BLANKENSHIP, Administrative Patent Judges

LALL, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection¹ of claims 16 to 22 and 24 to 36. Claims 1 to 15 and 23 have been canceled.

¹An amendment after final was filed as paper no. 9 and its entry was approved by the examiner. See paper no. 10. We note that the claims listed by appellants on page 2 of the brief on appeal are incorrect. The correct listing of the claims on appeal is as stated above.

The disclosed invention relates to electrical connections to high dielectric constant materials in microelectronic structures such as capacitors. One embodiment of the invention comprises a conductive lightly donor doped perovskite layer, and a high-dielectric constant material layer overlaying the conductive lightly donor doped perovskite layer. The conductive lightly donor doped perovskite layer provides a substantially chemically and structurally stable electrical connection to the high-dielectric-constant material layer. The lightly donor doped perovskite can generally be deposited and etched by effectively the same techniques that are developed for the dielectric. The same equipment may be used to deposit and etch both the perovskite electrode and the dielectric. Further understanding of the invention can be obtained by the following claim:

16. A method of forming a thin-film microelectronic capacitor on an integrated circuit, said method comprising:

(a) forming an electrically conductive buffer layer on said integrated circuit;

(b) forming a conductive, lanthanum doped barium strontium titanate layer having between about 0.01

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and about 0.3 mole percent lanthanum doping on said electrically conductive buffer layer;

(c) forming a barium strontium titanate dielectric layer on said lanthanum doped barium strontium titanate layer; and

(d) forming an upper electrode on said barium strontium titanate layer.

The examiner relies upon the following references:

Kaiser et al. (Kaiser)	3,305,394	Feb. 21, 1967
Brauer et al. (Brauer)	3,569,802	Mar. 09, 1971
McSweeney	4,309,295	Jan. 05, 1982
Miyasaka et al. (Miyasaka)	5,053,917	Oct. 01, 1991

Peng et al. (Peng), "Compensation Effect in Semiconducting Barium Titanate", Communications of the American Ceramic Society, 71(1) Journal of American Ceramic Society, pp. C-44 to C-46 (1988).

Uchino, "Electrodes for Piezoelectric Actuators", Ceramics, vol. 21 (3), pp. 229-236 (1986).

Claims 16 to 19, 21, 23, 25, 26, 28, and 32 to 36 stand rejected under 35 U.S.C § 103 as being unpatentable over Kaiser, McSweeney and Miyasaka. Claims 20, 22, 24 and 27 stand rejected under 35 U.S.C § 103 as being unpatentable over

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Kaiser, McSweeney, Miyasaka and Brauer or Peng. Also, claims 16 to 22, and 24 to 36 stand rejected under 35 U.S.C. § 103 as being unpatentable over Uchino and Miyasaka.

Rather than repeat the arguments of appellants and the examiner, we make reference to the briefs² and the answer³ for the respective details thereof.

OPINION

We have considered the rejections advanced by the examiner and the supporting arguments. We have, likewise, reviewed the appellants' arguments set forth in the briefs.

We reverse.

In our analysis here, we are guided by the general proposition that in an appeal involving a rejection under 35

² Two reply briefs were filed as papers nos. 14 and 16. Both were entered into the record by the examiner.

³ The examiner responded to each of the reply briefs in papers nos. 15 and 17 respectively.

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U.S.C. § 103, an examiner is under a burden to make out a prima facie case of obviousness. If that burden is met, the burden of going forward then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cit. 1992); In re

Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cit. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). We are further guided by the precedent of our reviewing court that the limitations from the disclosure are not to be imported into the claims. In re Lundberg, 244 F.2d 543, 113 USPQ 530 (CCPA 1957); In re Queener, 796 F.2d 461, 230 USPQ 438 (Fed. Cir. 1986). We also note that the arguments not made separately for any individual claim or claims are considered waived. See 37 CFR § 1.192(a) and (c).

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In re Baxter Travenol Labs., 952 F.2d 388, 391, 21 USPQ2d
1281, 1285 (Fed. Cir. 1991)

("It is not the function of this court to examine the claims
in greater detail than argued by an appellant, looking for
nonobviousness distinctions over the prior art."); In re
Wiechert, 370 F.2d 927, 936, 152 USPQ 247, 254 (CCPA
1967)("This court has uniformly followed the sound rule that
an issue raised below which is not argued in that court, even
of it has been properly brought here by reason of appeal is
regarded as abandoned and will not be considered. It is our
function as a court to decide disputed issues, not to create
them.").

Analysis

At the outset, we note that appellants have elected,
brief at page 4, to have claims 16 to 22, and 24 to 36 stand
or fall together. We also note that there are three separate
combinations of the applied references for the rejections on
appeal. We will consider each combination separately.

The rejection over Kaiser, McSweeney and Miyasaka

The examiner rejects claims 16 to 19, 21, 23, 25, 26, 28, and 32 to 36 under this combination. The examiner asserts, answer at page 5 that "it would have been obvious . . . to have modified Kaiser et al. . . . process with McSweeney . . . compositions because the ferroelectric materials utilized in both disclosures are equivalent and the substitution of these equivalent materials for each other would have been anticipated to produce an expected result." The examiner further asserts, id. at 6 that, "[s]ince the materials are identical, it is the examiner's position that Kaiser et al.'s . . . electrode functions equivalently to that of the instant application's buffer layer and the mere difference in terminology describing the layer underneath the lanthanum doped barium strontium titanate layer does not make the claims patentably distinct."

Appellants argue, brief at page 6, that,

[t]he examiner argues that similar materials are equivalent even if the properties are modified from non-conductive to conductive. The Kaiser patent is directed toward dielectric layers using perovskite material. In contrast, Applicant uses similar perovskite materials for a conductive electrode to a dielectric. Thus, there is a difference in

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materials and structure that is not accounted for in the examiner's combination.

The appellants further argue, id. at 7, that,

[p]rior to applicant's disclosure, apparently no one had considered that the problems associated with traditional electrodes for high-dielectric materials could be solved with perovskite electrodes. There is no teaching cited by Examiner that a perovskite electrode would not have the oxygen diffusion and adhesion problems in integrated circuits which are associated with the metal electrodes of the prior art, such as the platinum electrode used by Kaiser.

We have studied the three references, Kaiser, McSweeney and Miyasaka, and find no disclosure or teaching in any of these references that the electrodes in the high dielectric constant capacitors can be made of an alloy, rather than only from metal. We find no suggestion where the electrodes can be made from a perovskite, let alone one having a combination composition such as claimed by appellants in part (b) of claim 16, and in other independent claims.

Therefore, we do not sustain the obviousness rejection of these claims over Kaiser, McSweeney and Miyasaka et al.

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Rejection under Kaiser, McSweeney, Miyasaka and
Brauer or Peng

The examiner rejects, answer at page 7 to 9, claims 20, 22, 24 and 27 over this combination of references. Even though appellants do not specifically discuss the Brauer patent or the Peng publication, we find that neither Brauer nor Peng cure the deficiency noted above in the combination of Kaiser, McSweeney and Miyasaka. Each of these claims depend on claim 16 and contain the same limitations. Therefore, we do not sustain the obviousness rejection of claims 20, 22, 24 and 27 over Kaiser, McSweeney, Miyasaka, and Brauer or Peng.

Rejection under Uchino and Miyasaka

Claims 16 to 22, and 24 to 36 are rejected under 35 U.S.C.

§ 103 as being unpatentable over this combination. The examiner gives a detailed explanation of the rejection at pages 9 and 10 of the examiner's answer. Appellants argue, brief at page 9, that,

[a]s the examiner pointed out, Uchino does suggest that his laminate electrode structure for piezoelectric actuators is similar to laminate capacitor electrodes which are also made using thick film technology. A laminate capacitor is formed similar to that described by Uchino on page 8 where the materials are spread on

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sheets which are then laminated together.
Thick-film capacitor is defined in McGraw-Hill Dictionary of Science and Technical Terms, Fourth Ed., 1989, as follows: "A capacitor in a thick-film circuit, made by successive screen-printing and firing processes."

Appellants also argue, id., that,

[i]n contrast to Uchino's thick-film technology, Applicant claims a microelectronic capacitor on a semiconductor substrate for an integrated circuit. Thin-film is defined in McGraw-Hill Dictionary . . . as follows: "A film a few molecules thick deposited on a glass, ceramic, or semiconductor substrate to form a capacitor, resistor, coil, cryotron, or other circuit component."

Appellants further argue, id. at page 10, that,

Miyasaka does not teach or suggest that it would be desirable to use the electrodes from laminate structures taught by Uchino and combine them with thin-film structures to solve the problems of electrodes for integrated circuit thin-film capacitors.

We agree with the appellants' position. The examiner has not convinced us why an artisan would look to Uchino (which involves a totally different process of thick-film technology) to combine with Miyasaka (which involves the thin-film technology) to come up with the invention recited in claim 16 without using

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the appellants' disclosure as a road map. We also so noted this in our related decision in Appeal No. 97-2026, Serial No. 08/317,108.

The Federal Circuit states that "[the] mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Fritch, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), citing In re Gordon, 773 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). "Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor." Para-Ordnance Mfg. v. SGS Importers Int'l, 73 F.3d 1087, 37 USPQ 2d at 1239 (Fed. Cir. 1995), citing W. L. Gore & Assocs., v. Garlock Inc., 721 F.2d at 1551, 1553, 220 USPQ at 311, 312-13 (Fed. Cir. 1983).

Thus we are of the opinion that the combination of Uchino and Miyasaka is not proper. Therefore, we do not sustain the obviousness rejection of claims 16 to 22, and 24 to 36 over Uchino and Miyasaka.

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In conclusion, we have not sustained the rejection under 35 U.S.C. § 103 of claims 16 to 19, 21, 23, 25, 26, 28, and 32 to 36 over Kaiser, McSweeney and Miyasaka; of claims 20, 22, 24 and 27 over Kaiser, McSweeney, Miyasaka and Brauer or Peng; and of claims 16 to 22 and 24 to 36 over Uchino and Miyasaka.

REVERSED

PARSHOTAM S. LALL)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JOSEPH L. DIXON)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES
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